

RF Test Report

Project Number: 4494805**Quotation Number:** 02212019TH-1.3**Report Number:** 4494805EMC02**Revision Level:** 3**Client:** Lifeline Systems Inc**Equipment Under Test:** Medical Alert System**Model Name:** Wireless Communicator**Model Number:** 7200C**FCC ID:** BDZ7200C**IC:** 655C-7200C**Applicable Standards:** FCC Part 15 Subpart C, § 15.249

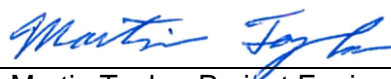
RSS-210, Issue 10, December 2019 (Annex F)

RSS-GEN, Issue 5, March 2019 Amendment 1

ANSI C63.10: 2013

Report issued on: 20 January 2020**Test Result:** Compliant

Tested by:



Martin Taylor, Project Engineer

Reviewed by:



David Schramm, Operations Manager

Remarks: This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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1 Summary of Test Results

| Test Description | Test Specification | Test Result |
|--------------------------------------|--|----------------|
| Field Strength of Fundamental | 15.249(a), RSS-210 F.1(a) | Compliant |
| Field Strength of Spurious Radiation | 15.249(a)(d) and 15.209 RSS-210 F.1(a)(b)(e) | Compliant |
| Fixed, Point-to-Point | 15.249(b) | Not Applicable |
| 20 dB Bandwidth | 15.215(c) | Reported |
| 99% Occupied Bandwidth | RSS-GEN 6.7 | Reported |
| AC Powerline Conducted Emissions | 15.107, 15.207, RSS-GEN 8.8 | Compliant |

1.1 Modifications Required for Compliance

None

2 General Information

2.1 Client Information

Name: Lifeline Systems Inc
Address: 111 Lawrence Street
City, State, Zip, Country: Framingham, MA 01702 USA

2.2 Test Laboratory

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA
Type of lab: Testing Laboratory
Certificate Number: 3212.01

2.3 General Information of EUT

Equipment Under Test: Medical Alert System
Model Name: Wireless Communicator
Model Number: 7200C
Serial Number: 9040234871, 9040234870
IMEI Number: 356935081116433, 356935081109347
FCC ID: BDZ7200C
IC: 655C-7200C

Tx Frequency Range: 917 – 921 MHz (ISM Band)
Antenna Type: Two Internal PCB Antennas (selectable)
Type: Pre-Production

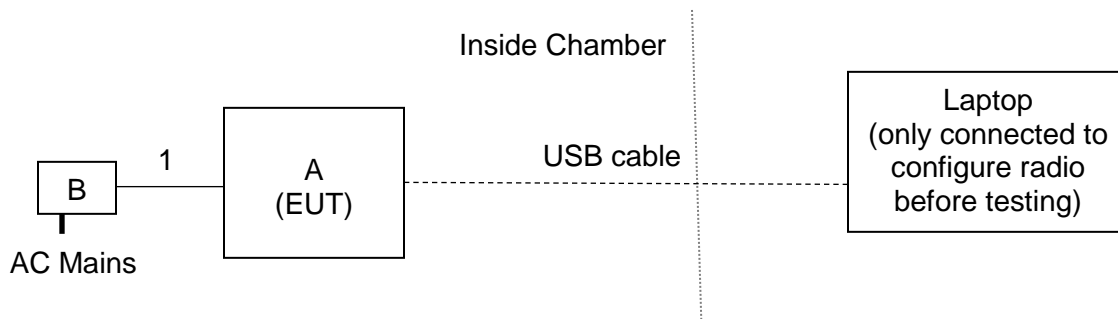
Rated Voltage: 100-240Vac, 50/60Hz
Test Voltage: 120Vac, 60Hz

Sample Received Date: 08 July 2019
Dates of testing: 09-10 July and 15 August 2019

2.4 Operating Modes and Conditions

The EUT had an internal battery pack installed and was connected to the AC Mains using the supplied AC/DC wall adapter. The EUT was running test mode software which allowed it to be commanded to turn on a continuous transmit signal at maximum power at different channels in the 900 MHz ISM Band. The EUT only used channels with center frequencies ranging from 917 to 921 MHz.

2.5 EUT Connection Block Diagram



2.6 System Configurations

| Device Reference | Manufacturer | Description | Model Number | Serial Number |
|------------------|----------------------|-----------------------------|-------------------|--------------------------|
| A | Lifeline Systems Inc | Wireless Communicator (EUT) | 7200C | 9040234871 9040234870 |
| B | Lifeline Systems Inc | AC/DC Adapter | MANGO018-12B-USA2 | Not labeled |

2.7 Cable List

| Cable reference | Port Name | Start | End | Cable Length (m) | Ferrite installed? | Shielded? |
|-----------------|-----------|---------------|-----------------------|------------------|--------------------|-----------|
| 1 | DC Power | AC/DC Adapter | Wireless Communicator | 3.5 | No | No |

3 Field Strength of Fundamental

3.1 Test Result

| Test Description | Test Specification | Test Result |
|-------------------------------|-----------------------------|-------------|
| Field Strength of Fundamental | 15.249(a) RSS-210 F.1(a) | Compliant |

3.2 Test Method

The test data was measured using a Quasi-Peak detector below 1GHz and a Peak detector above 1GHz. The receiver's resolution bandwidth was set to 120 kHz for measurements taken in the 30MHz to 1GHz frequency range and 1MHz for measurements for 1GHz and higher. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency. The radiated measurements were recorded and compared to the limits indicated in the table below.

| Used | Fundamental Frequency | QP / Average Limits | | | Peak Limits dBuV/m |
|------|-----------------------|---------------------|--------------|--------------------|-----------------------|
| | | Millivolts/meter | Microvolts/m | dBuV/m | |
| Yes | 902 - 928 MHz | 50 | 50000 | 94 ⁽¹⁾ | -- |
| No | 2400 - 2483.5 MHz | 50 | 50000 | 94 ⁽²⁾ | 114 |
| No | 5725 - 5875 MHz | 50 | 50000 | 94 ⁽²⁾ | 114 |
| No | 24 - 24.25 GHz | 250 | 250000 | 108 ⁽²⁾ | 128 |

(1) Quasi-peak limit

(2) Average limit

3.3 Test Site

3m Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

Environmental Conditions

Temperature: 23.6 °C

Relative Humidity: 46.7 %

Atmospheric Pressure: 97.9 kPa

3.4 Test Equipment

Test End Date: 10-Jul-2019

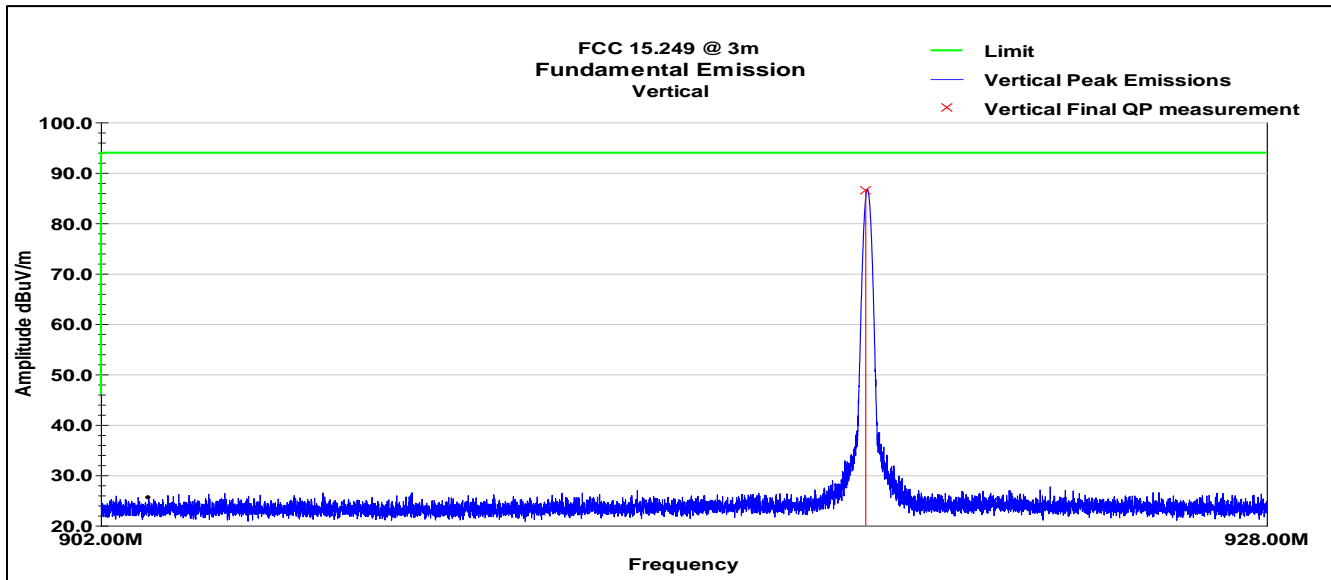
Tester: MT

| Equipment | Model | Manufacturer | Asset Number | Cal Due Date |
|---------------------|------------------|-------------------------|--------------|--------------|
| ANTENNA, BILOG | JB6 | SUNOL | B079689 | 30-Oct-2019 |
| RF CABLE | SF106 | HUBER & SUHNER | B079661 | 30-Sep-2019 |
| RF CABLE | NFS-290-78.7-NFS | FLORIDA RF LABS | B095019 | 30-Sep-2019 |
| RF CABLE | LMR-240 | TIMES MICROWAVE SYSTEMS | B092136 | 30-Sep-2019 |
| RF CABLE | SUCOFLEX 100 | HUBER & SUHNER | B108523 | 30-Sep-2019 |
| LOW NOISE AMPLIFIER | TS-PR18 | ROHDE & SCHWARZ | 15003 | 24-Jan-2020 |
| EMI TEST RECEIVER | ESU40 | ROHDE & SCHWARZ | B079629 | 15-Aug-2019 |

Note: The equipment calibration period is 1 year.

3.5 Test Data

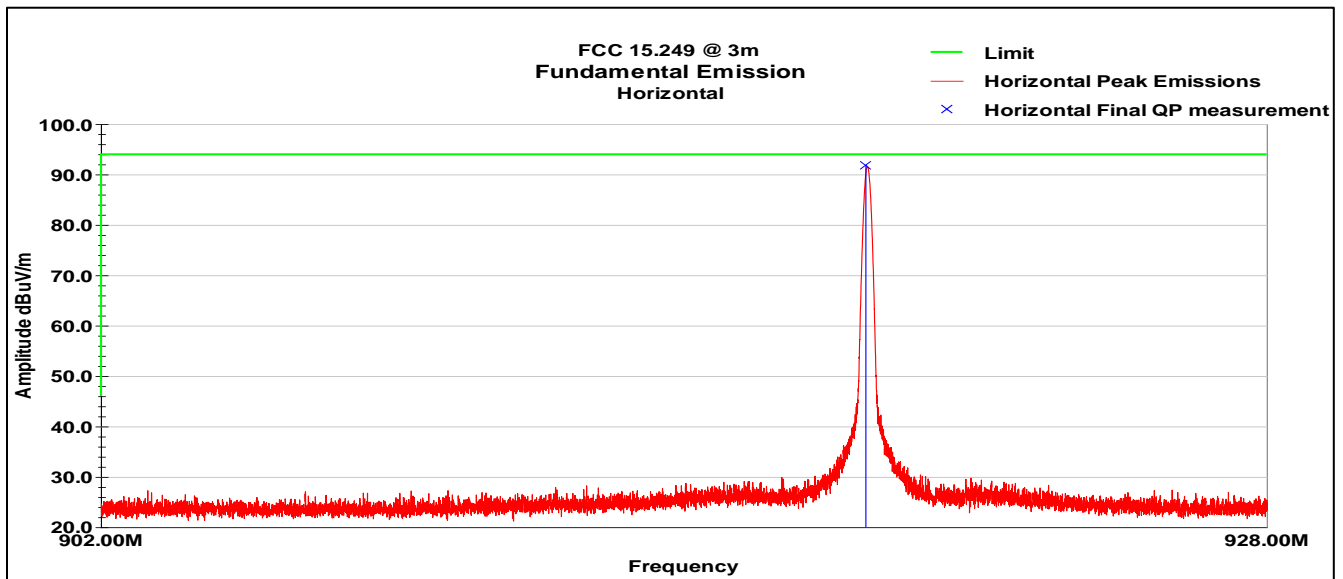
Vertical Plot



Vertical Data

| Frequency MHz | Raw QP (dBuV) | Polarity (V/H) | Azimuth (degrees) | Height (cm) | AF (dB/m) | Loss (dB) | Amp (dB) | QP Value (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------------------------------|------------------|-------------------|----------------------|----------------|--------------|--------------|-------------|----------------------|-------------------|----------------|
| 918.98 | 95.5 | V | 283.0 | 110.0 | 23.1 | 2.5 | 34.5 | 86.6 | 94.0 | -7.4 |
| QP Value = Level + AF + CL - Amp | | | | | | | | | | |
| Margin = QP Value - Limit | | | | | | | | | | |

Horizontal Plot



Horizontal Data

| Frequency MHz | Raw QP (dBuV) | Polarity (V/H) | Azimuth (degrees) | Height (cm) | AF (dB/m) | Loss (dB) | Amp (dB) | QP Value (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------------------------------|------------------|-------------------|----------------------|----------------|--------------|--------------|-------------|----------------------|-------------------|----------------|
| 918.98 | 100.8 | H | 91.0 | 152.0 | 23.1 | 2.5 | 34.5 | 91.9 | 94.0 | -2.1 |
| QP Value = Level + AF + CL - Amp | | | | | | | | | | |
| Margin = QP Value - Limit | | | | | | | | | | |

4 Field Strength of Spurious Radiation

4.1 Test Result

| Test Description | Test Specification | Test Result |
|--------------------------------------|--|-------------|
| Field Strength of Spurious Radiation | 15.249(a)(d) and 15.209 RSS-210 F.1(a)(b)(e) | Compliant |

4.2 Test Method

The initial exploratory scans were performed over the frequency ranges as indicated in the table below using the max hold function using TILE! software. The pre-scans were performed with the EUT oriented in each of its three orthogonal axes to determine the orientation that produces the highest emissions. The final test data was measured using a Quasi-Peak detector below 1GHz and Peak and Average detectors above 1GHz. The receiver's resolution bandwidth was set to 120 kHz for measurements taken in the 30MHz to 1GHz frequency range and 1MHz for measurements 1GHz and higher. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency. The radiated measurements were recorded and compared to the limits indicated in the table below.

| Frequency | QP / Average Limits | | Peak Limits dBuV/m |
|----------------|---------------------|---------------------|-----------------------|
| | Microvolts/m | dBuV/m | |
| 30 - 88 MHz | 100 | 40 ⁽¹⁾ | -- |
| 88 - 216 MHz | 150 | 43.5 ⁽¹⁾ | -- |
| 216 - 960 MHz | 200 | 46 ⁽¹⁾ | -- |
| 960 - 1000 MHz | 500 | 54 ⁽¹⁾ | -- |
| 1 - 40 GHz | 500 | 54 ⁽²⁾ | 74 |

(1) Quasi-peak limit

(2) Average limit

4.3 Test Site

Absorber Lined Shielded Enclosure (ALSE), Suwanee, GA

| | | |
|--------------------------|-------------|------------|
| Environmental Conditions | 30-1000 MHz | 1-10 GHz |
| Enclosure: | 10m chamber | 3m chamber |
| Temperature: | 22.6 °C | 22.3 °C |
| Relative Humidity: | 52.3 % | 57.7 % |
| Atmospheric Pressure: | 97.6 kPa | 98.0 kPa |

4.4 Test Equipment

30-1000 MHz

Test End Date: 9-Jul-2019

Tester: MT

| Equipment | Model | Manufacturer | Asset Number | Cal Due Date |
|---------------------|--------------|-----------------|--------------|--------------|
| ANTENNA, BILOG | JB6 | SUNOL | B079690 | 11-Dec-2019 |
| RF CABLE | SF106 | HUBER & SUHNER | B079712 | 30-Sep-2019 |
| RF CABLE | SF106 | HUBER & SUHNER | B079713 | 30-Sep-2019 |
| RF CABLE | SF106 | HUBER & SUHNER | B079659 | 30-Sep-2019 |
| RF CABLE | SUCOFLEX 100 | HUBER & SUHNER | B108523 | 30-Sep-2019 |
| LOW NOISE AMPLIFIER | TS-PR18 | ROHDE & SCHWARZ | 15003 | 24-Jan-2020 |
| EMI TEST RECEIVER | ESU40 | ROHDE & SCHWARZ | B079629 | 15-Aug-2019 |

1-10 GHz

Test End Date: 10-Jul-2019

Tester: MT

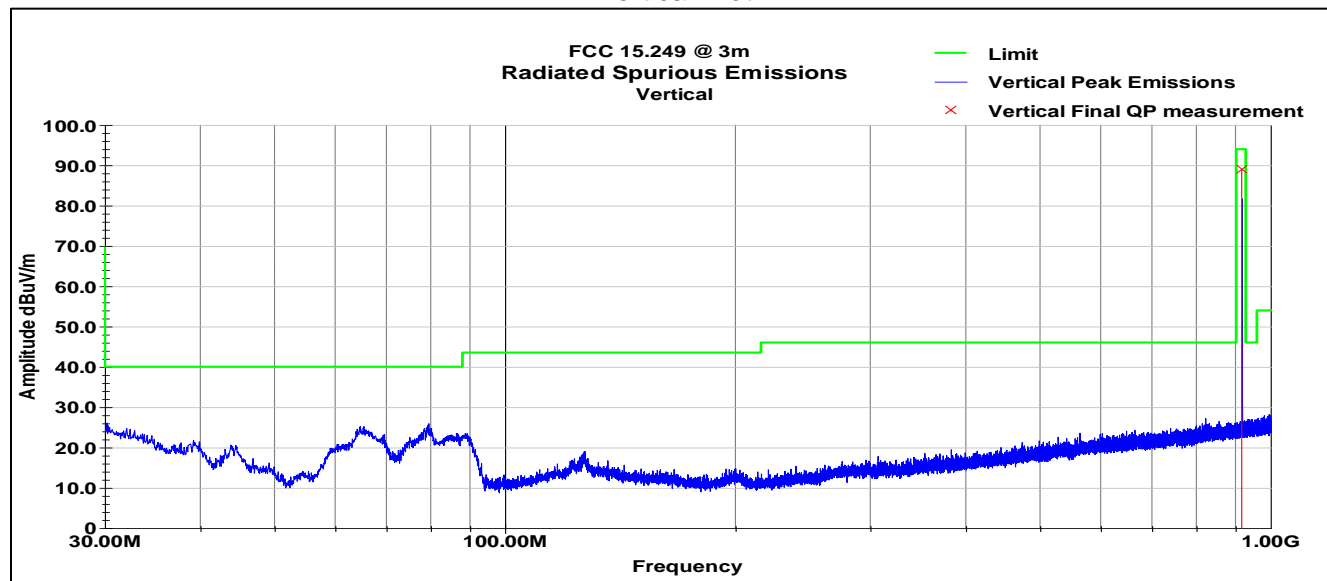
| Equipment | Model | Manufacturer | Asset Number | Cal Due Date |
|----------------------------|-------------------|-----------------|--------------|--------------|
| ANTENNA, DRG HORN (MEDIUM) | 3117 | ETS LINDGREN | B079699 | 2-Jul-2020 |
| RF CABLE | NMS-290-236.2-NMS | FLORIDA RF LABS | B095020 | 23-Jul-2019 |
| RF CABLE | SUCOFLEX 100 | HUBER & SUHNER | B108523 | 30-Sep-2019 |
| LOW NOISE AMPLIFIER | TS-PR18 | ROHDE & SCHWARZ | 15003 | 24-Jan-2020 |
| EMI TEST RECEIVER | ESU40 | ROHDE & SCHWARZ | B079629 | 15-Aug-2019 |

Note: The equipment calibration period is 1 year.

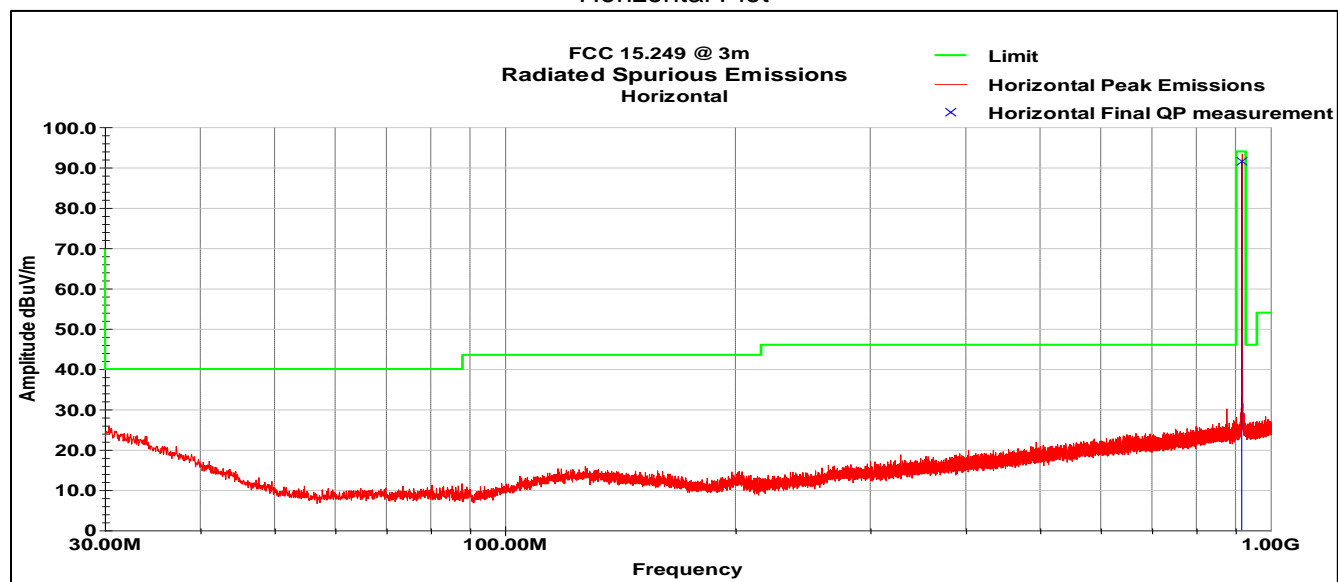
4.5 Test Data

4.5.1 30-1000 MHz

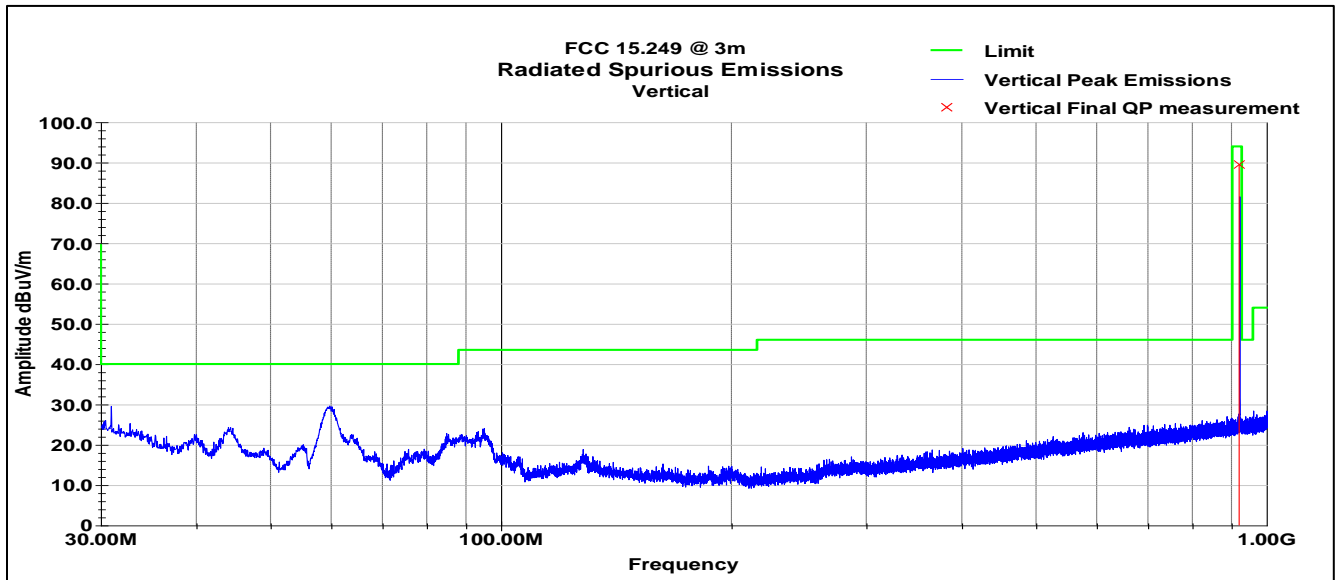
ISM Band Low Channel (917 MHz) Vertical Plot



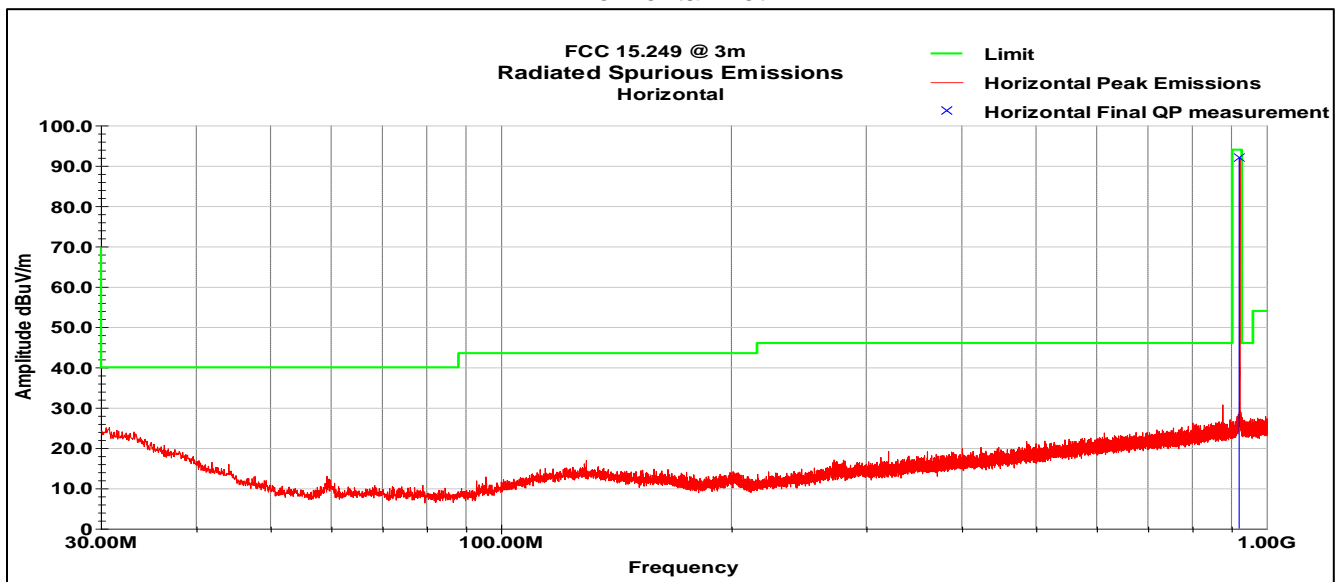
Horizontal Plot



ISM Band High Channel (921 MHz) Vertical Plot

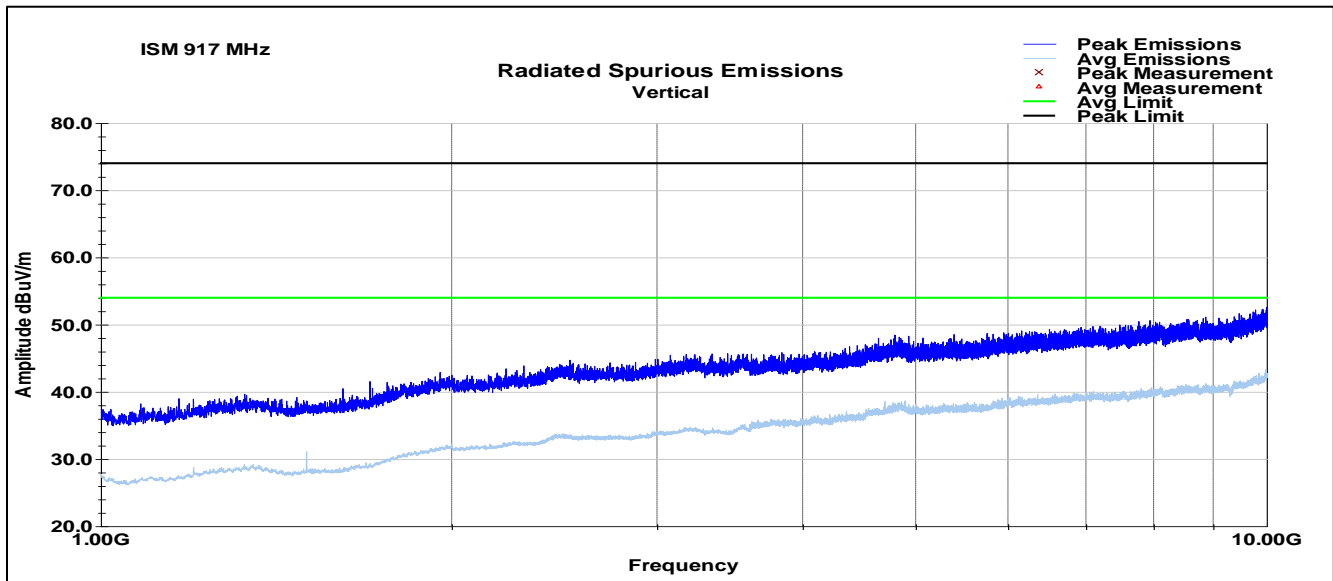


Horizontal Plot

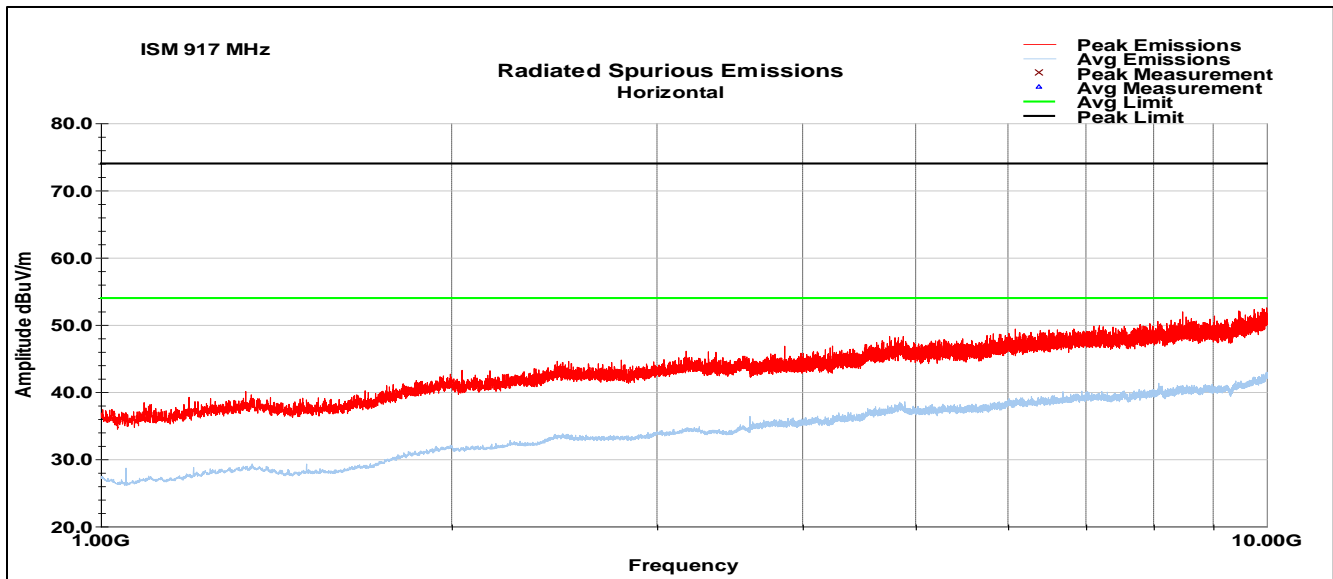


4.5.2 1-10 GHz

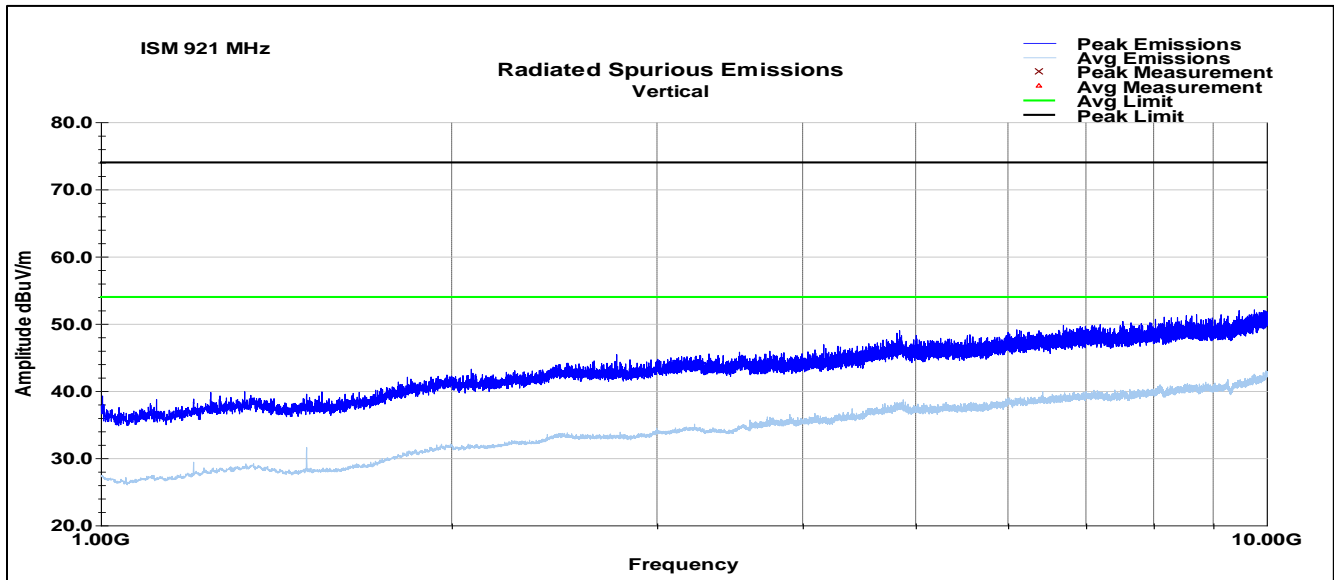
ISM Band Low Channel (917 MHz) Vertical Plot



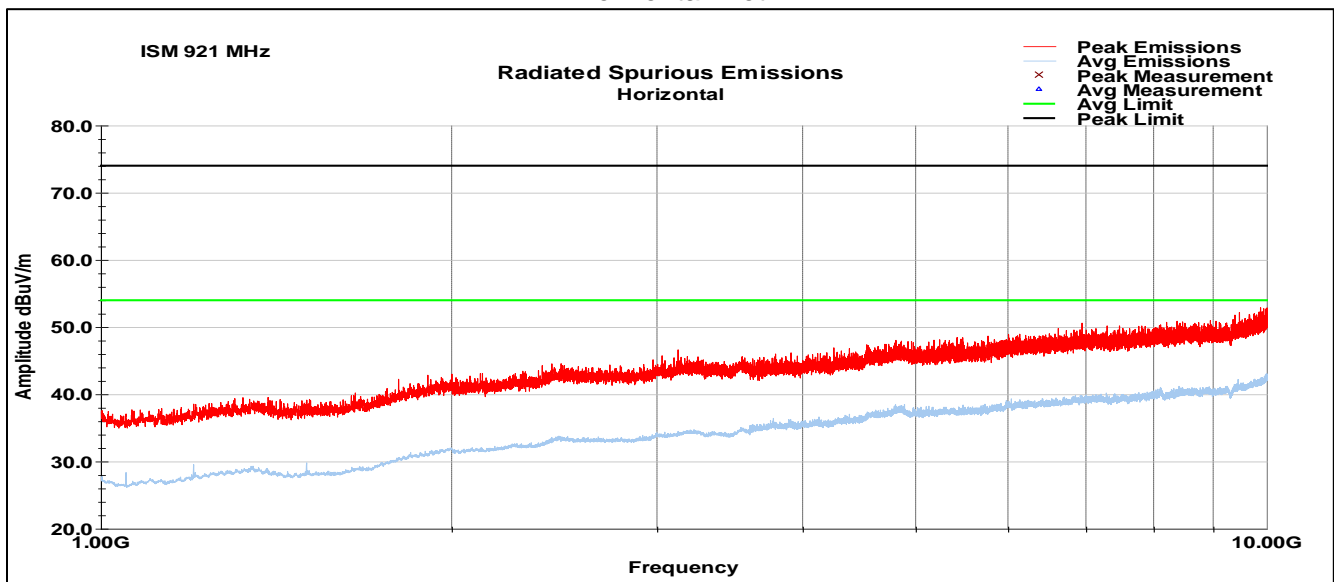
Horizontal Plot



ISM Band High Channel (921 MHz) Vertical Plot



Horizontal Plot



5 Bandwidth

5.1 Test Result

| Test Description | Basic Standards | Test Result |
|------------------------|-----------------|-------------|
| 20 dB Bandwidth | 15.215(c) | Reported |
| 99% Occupied Bandwidth | RSS-GEN 6.7 | Reported |

5.2 Test Method

The procedures from ANSI C63.10 clause 6.9 were used to determine the 20 dB Bandwidth and the 99% Occupied Bandwidth.

5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.9 °C

Relative Humidity: 48.3 %

Atmospheric Pressure: 97.5 kPa

5.4 Test Equipment

Test End Date: 15-Aug-2019

Tester: MT

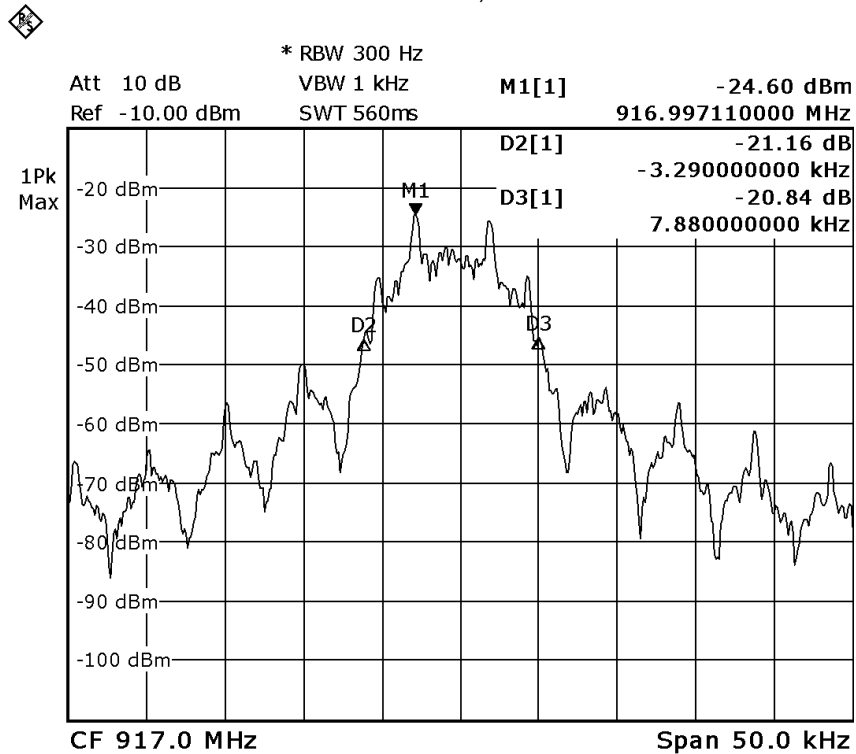
| Equipment | Model | Manufacturer | Asset Number | Cal Due Date |
|-----------------------------|-------|-----------------|--------------|--------------|
| NETWORK / SPECTRUM ANALYZER | ZVL6 | ROHDE & SCHWARZ | B079799 | 16-Apr-2020 |
| RF CABLE (TS8997) | 141 | Huber & Suhner | B095586 | 30-Sep-2019 |

Note: The equipment calibration period is 1 year.

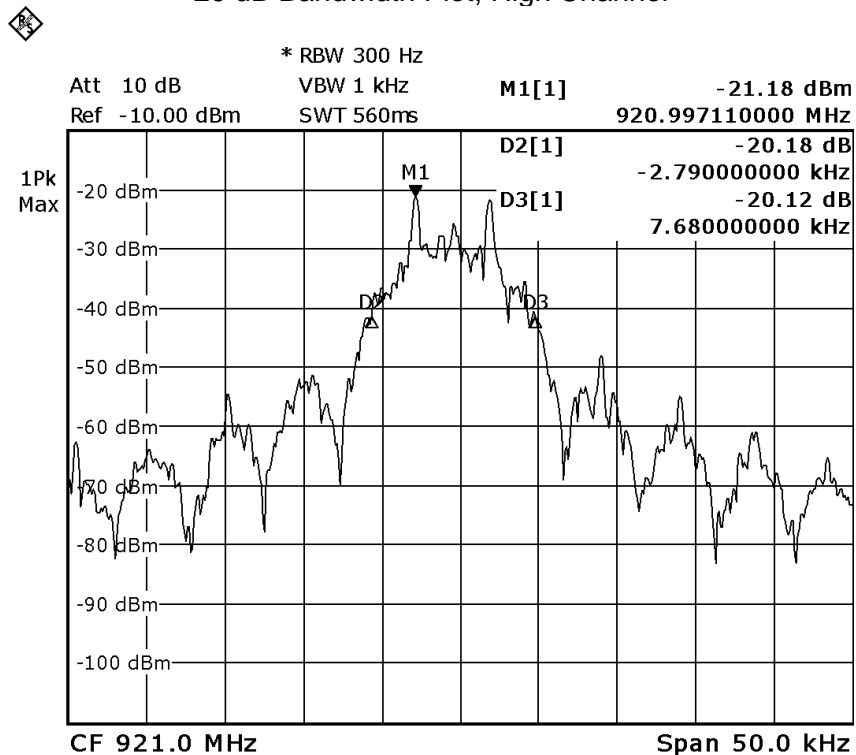
5.5 Test Data

| Test Description | EUT Frequency | Bandwidth |
|------------------------|---------------|-----------|
| 20 dB Bandwidth | 917 MHz | 11.17 kHz |
| 20 dB Bandwidth | 921 MHz | 10.47 kHz |
| 99% Occupied Bandwidth | 917 MHz | 10.48 kHz |
| 99% Occupied Bandwidth | 921 MHz | 10.78 kHz |

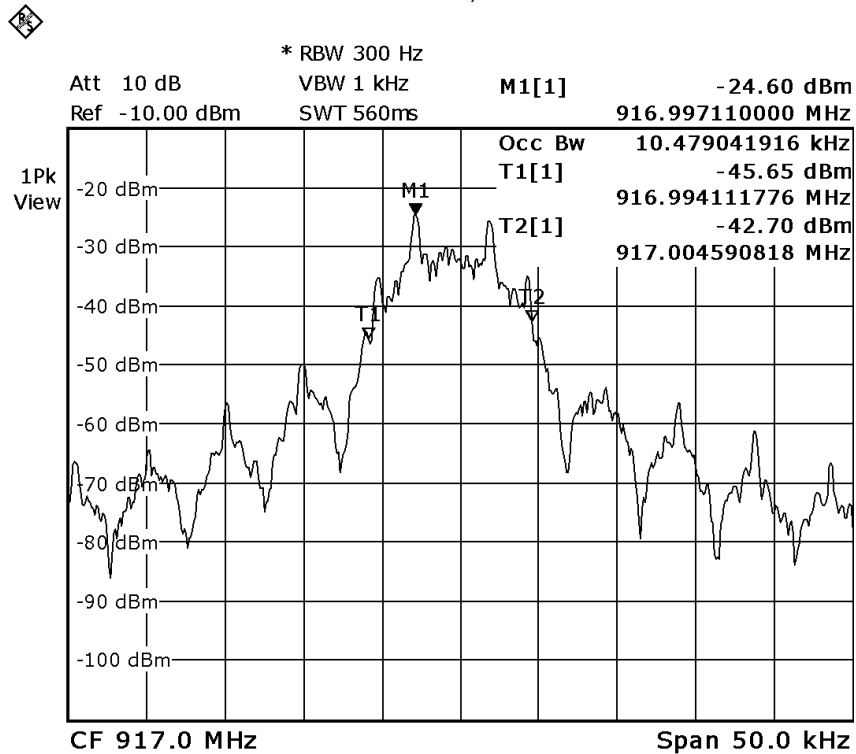
20 dB Bandwidth Plot, Low Channel



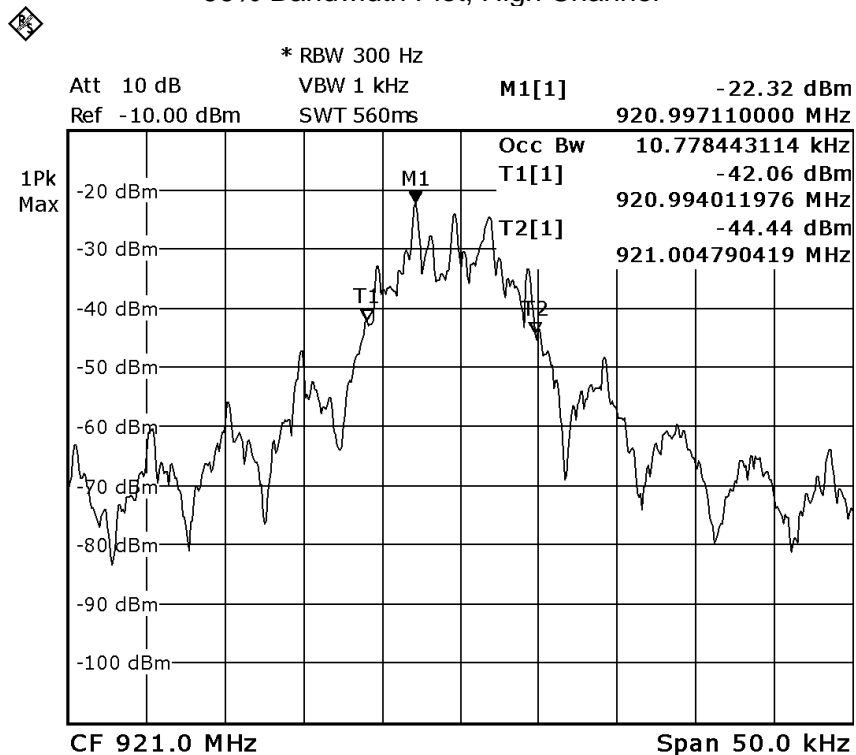
20 dB Bandwidth Plot, High Channel



99% Bandwidth Plot, Low Channel



99% Bandwidth Plot, High Channel



6 AC Powerline Conducted Emissions

6.1 Test Result

| Test Description | Basic Standards | Test Result |
|---|--|-------------|
| AC Powerline Conducted Emissions, Class B | FCC 15.107, 15.207 RSS-GEN 8.8 ANSI C63.10: 2013 | Compliant |

6.2 Test Method

With the receiver's resolution bandwidth was set to 9 kHz, exploratory scans were performed over the measuring frequency range (0.15 MHz to 30 MHz) using a max hold mode incorporating a Peak detector and Average detector and using the TILE! software. The final test data was measured using a Quasi-Peak detector and Average detector and compared against the limits indicated in the table below.

| Frequency Range | Limits (dBuV) |
|-----------------|-----------------------------|
| 0.15 to 0.5 MHz | Avg 56 to 46 QP 66 to 56 |
| 0.5 to 5 MHz | Avg 46 Pk 56 |
| 5 to 30 MHz | Avg 50 Pk 60 |

6.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions:

Temperature: 23.5 °C

Relative Humidity: 45.2 %

Atmospheric Pressure 97.7 kPa

6.4 Test Equipment

Test End Date: 10-Jul-2019

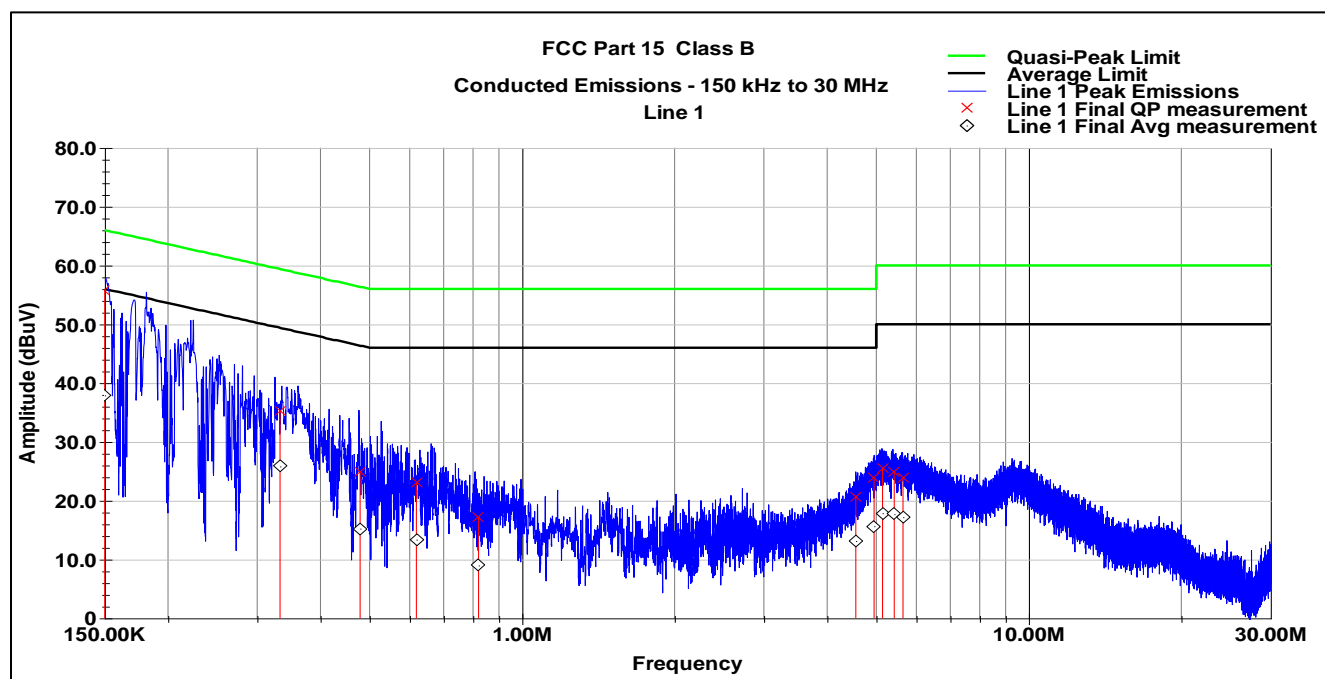
Tester: MT

| Equipment | Model | Manufacturer | Asset Number | Cal Due Date |
|--------------------------------------|------------|-----------------|--------------|--------------|
| LINE IMPEDANCE STABILIZATION NETWORK | NNB 51 | TESEQ | B087573 | 3-Dec-2019 |
| RF CABLE | UC-N-MM-78 | MAURY MICROWAVE | 17017 | 30-Sep-2019 |
| EMI TEST RECEIVER | ESU8 | ROHDE & SCHWARZ | B085759 | 17-Aug-2019 |

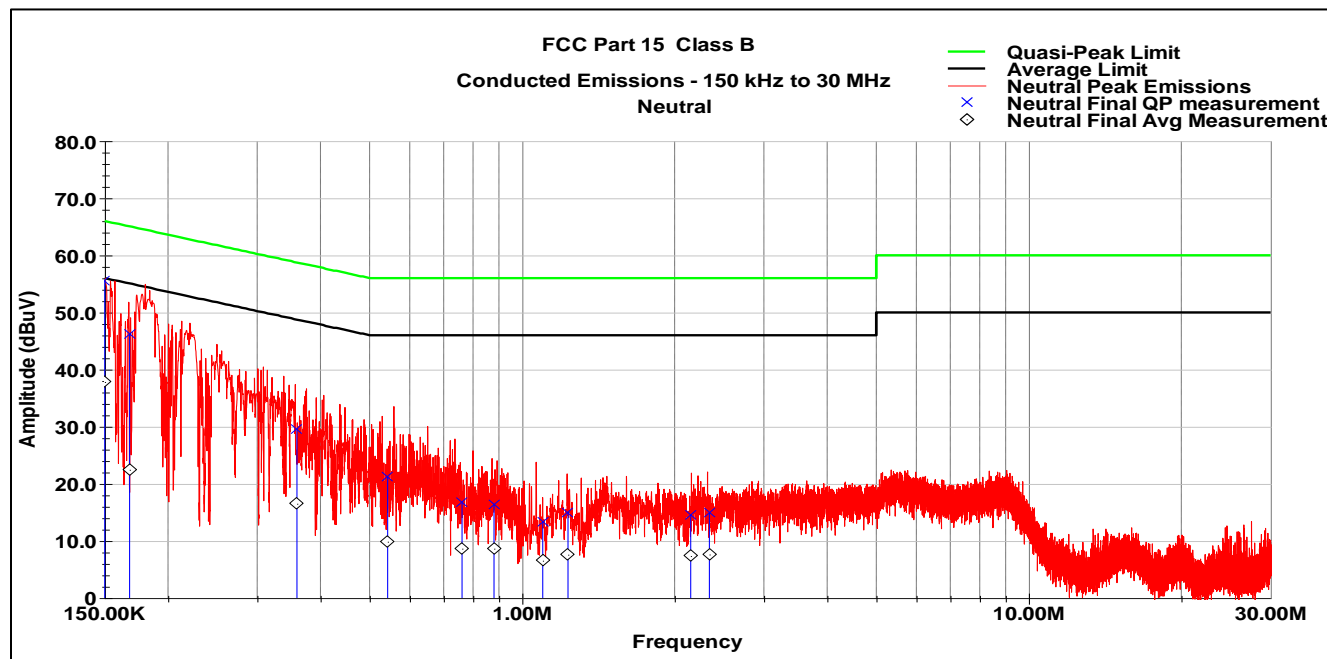
Note: The equipment calibration period is 1 year.

Software: "181112 Conducted Emissions TILE7" TILE! profile dated 12 Nov 2018

6.5 Test Data



| Frequency MHz | QP Value dBuV | QP Limit dBuV | QP Margin dB | Avg Value dBuV | Avg Limit dBuV | Avg Margin dB |
|------------------|------------------|------------------|-----------------|-------------------|-------------------|------------------|
| 0.150 | 55.8 | 66.0 | -10.2 | 37.9 | 56.0 | -18.1 |
| 0.333 | 35.2 | 59.4 | -24.2 | 25.8 | 49.4 | -23.6 |
| 0.479 | 25.0 | 56.3 | -31.4 | 15.3 | 46.3 | -31.1 |
| 0.618 | 23.1 | 56.0 | -32.9 | 13.4 | 46.0 | -32.6 |
| 0.820 | 17.2 | 56.0 | -38.8 | 9.0 | 46.0 | -37.0 |
| 4.555 | 20.6 | 56.0 | -35.4 | 13.1 | 46.0 | -32.9 |
| 4.950 | 23.9 | 56.0 | -32.1 | 15.7 | 46.0 | -30.3 |
| 5.144 | 25.4 | 60.0 | -34.6 | 17.9 | 50.0 | -32.1 |
| 5.424 | 25.0 | 60.0 | -35.0 | 17.7 | 50.0 | -32.3 |
| 5.646 | 24.0 | 60.0 | -36.0 | 17.2 | 50.0 | -32.8 |



| Frequency MHz | QP Value dBuV | QP Limit dBuV | QP Margin dB | Avg Value dBuV | Avg Limit dBuV | Avg Margin dB |
|------------------|------------------|------------------|-----------------|-------------------|-------------------|------------------|
| 0.150 | 55.6 | 66.0 | -10.4 | 37.8 | 56.0 | -18.2 |
| 0.168 | 46.2 | 65.1 | -18.9 | 22.5 | 55.1 | -32.6 |
| 0.359 | 29.7 | 58.7 | -29.0 | 16.5 | 48.7 | -32.2 |
| 0.543 | 21.2 | 56.0 | -34.8 | 9.9 | 46.0 | -36.1 |
| 0.761 | 16.7 | 56.0 | -39.3 | 8.6 | 46.0 | -37.4 |
| 0.880 | 16.4 | 56.0 | -39.6 | 8.6 | 46.0 | -37.4 |
| 1.098 | 13.4 | 56.0 | -42.6 | 6.5 | 46.0 | -39.5 |
| 1.232 | 15.0 | 56.0 | -41.0 | 7.6 | 46.0 | -38.4 |
| 2.151 | 14.6 | 56.0 | -41.4 | 7.4 | 46.0 | -38.6 |
| 2.342 | 14.9 | 56.0 | -41.1 | 7.6 | 46.0 | -38.4 |

7 Revision History

| Revision Level | Description of changes | Revision Date |
|----------------|--|-------------------|
| Draft | -- | 03 September 2019 |
| 0 | Initial release | 12 September 2019 |
| 1 | Removed incorrect FCC classification in section 2.3 | 11 November 2019 |
| 2 | Added AC Powerline Conducted Emissions test (sections 1 & 6) | 11 December 2019 |
| 3 | Updated standards references on title page | 20 January 2020 |
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